REMARKS

The applicant's remarks, below, are preceded by quotations of related comments of the examiner in small, bold-face type. The applicant's discussion of particular positions of the examiner does not constitute a concession with respect to any positions that are not expressly contested by the applicant. The applicant's emphasis of particular reasons why the claims are patentable does not imply that there are not other sufficient reasons why the claims are patentable.

1. Please provide the current status of Korean Application 97-66909 and the dates of any publications of the '909 application.

The Korean Application 97-66909 is currently pending for examination in the Korean Intellectual Property Office (KIPO). The date of its publication is July 5, 1999.

2. The disclosure is objected to because of the following informalities:
3. a) The last sentence on page 7 of the specification is not understood. In particular the use of "varying" is not understood.
b) The sentence extending from page 7 to page 8 is not understood. It is unclear as to what is meant by rolling the width to an amount corresponding to the thickness.
Appropriate correction is required.
4. The term "width rolling" is not understood.

Applicant has amended the specification to further clarify the meaning of "varying." The term "width rolling" refers to the sideway rolling of the slabs by a width roller or an "edger." No new matter has been introduced.

6. Claims 4 and 13-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
a) Claims 4 and 16, the term "width rolling" is not understood.
b) Claim 13, lines 7 and 12, the phrases, "of a first rolling" and "of a second rolling" are confusing. It appears the temperature would drop at least during the descaling and uncoiling.
c) Claim 13, lines 18 and 19, the use of "bar steels" is confusing. What makes a slab a "bar steel"?

Applicant has cancelled claim 4 and amended independent claim 13 to remove "first rolling" and "second rolling," and replace "bar steel" with "flat bar." No new matter has been added.

8. Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Passoni et al (5,430,930) in view of the comments in the specification.

Passoni teaches the process of cutting, heating, rolling, coiling, uncoiling and rolling. The specification teaches (page 8, lines 15-18) that heating before the second rolling allows the finishing mills to more easily roll the bars. It is well known that heating steel allows the steel to be deformed more easily. In view of the disclosure that the second heating causes no new or unexpected result, it is considered to have been an obvious matter of manufacturing expedience to provide a second heating in the process of Passoni et al. Limitations to temperatures and specific reductions are considered to be obvious matters of choice in the absence of disclosure of these limitations causing new or unexpected results. Official Notice is taken of welding slabs together to maintain continuous rolling. It would have been obvious to one of ordinary skill in the art to weld the slabs of Passoni together to allow for continuous rolling.

9. It is noted that the claims do not specify that sulfur is present and that temperatures are being maintained to prevent cracking. it is well known that sulfur causes cracking during rolling. It is considered to have been within the level of skill of the ordinary artisan to maintain conditions to prevent cracking during rolling. Yamada et al (4,709,572) (col. 1, lines 48-49) teaches that sulfur is known to cause cracking when rolling steel.

The applicant has amended independent claims 1 and 13 to include the feature recited in claims 4 and 16, respectively, now cancelled.

Neither Passoni nor applicant's specification, alone or in combination, teaches or suggests "width rolling the cut slabs by using a width roller," and "descaling the cut slabs heated in the first heating furnace," as recited in the applicant's amended independent claims 1 and 13.

In addition, although Passoni describes a method of manufacturing hot strip steel using a continuous slab caster, Passoni neither describes nor suggests flat slabs which are rolled reversibly in both directions, as recited in amended claims 1 and 13. Rather, Passoni describes flat bars which are rolled only in one direction.

Further, the presence of sulphur is properly supported by the specification, where applicant provides:

> However, in the case where Mn (Manganese) is contained in steel, when S of the grain boundaries is precipitated into MnS, brittleness disappears. Mn + S → MnS precipitation and growth reaction are determined by diffusibility of Mn, and if maintained for approximately 10 minutes at 1050° C, over 70% of S is precipitated into MnS. (Specification, page 7, lines 13-17).

As described above, over 70% of the Sulphur (S) is precipitated into Manganese Sulfide (MnS) by the chemical reaction Mn + S → MnS. Therefore, prevention of slab cracking is possible during the rolling processes. As the recited steps of the claims are properly supported by the specification, the omission of the presence of sulphur does not render the claims unpatentable.

Independent claims 1 and 13 and all of their dependent claims are patentable for at least the same reasons as claims 1 and 13.

Attached is a marked-up version of the changes being made by the current amendment.

Applicant asks that all claims be allowed. Enclosed is a $110.00 check for the Petition for Extension of Time fee. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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Y. Rocky Tsao

Y. Rocky Tsao
Reg. No. 34,053

Fish & Richardson P.C.
225 Franklin Street
Boston, Massachusetts 02110-2804
Telephone: (617) 542-5070
Facsimile: (617) 542-8906

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Version with markings to show changes made

In the specification:

Paragraph beginning at page 7, line 30 has been amended as follows:

-- Preferably, a width roller 22 is mounted upstream from the first descaler 18a for controlling [varying] a width of the slabs before the descaling [varying] operation. At this time, [the width of the slabs is rolled to an amount corresponding to] the slabs are width-rolled based on a thickness of the slabs, and the width roller 22 enables the width of the slabs to be rolled up to roughly 14-15 mm. Further, by the width rolling of the slabs before the descaling operation, cracks are formed on the scales such that the subsequent descaling of the slabs is improved. --

In the claims:

Claims 4, 8, 16, 20 has been cancelled.

Claims 1, 6, 13, 16, 18, 20 has been amended as follows:

-- 1. A method for manufacturing hot rolled steel sheets comprising the steps of:

passing molten steel through a continuous caster having a mold after having been poured into a ladle and a tundish to manufacture a slab;

cutting the slab to predetermined lengths using a cutter to form a plurality of cut slabs;

heating the cut slabs to a predetermined temperature in a first heating furnace;

width rolling the cut slabs by using a width roller;

descaling the cut slabs [heated in the first heating furnace] in a reduction unit to a predetermined thickness to form a plurality of flat bars;

rolling the slabs in a reduction unit to a predetermined thickness [to form a plurality of flat bars] in a second heating furnace;

coiling the flat bars by a coiling station while the flat bars are maintained in a heated state;

uncoiling the flat bars by an uncoiler; and

rolling the flat bars to a predetermined thickness in a finishing mill in a reversible manner.

6. The method of claim [4] 1 wherein the slabs being rolled in the reduction unit are maintained to a temperature between 800 and 1000° C at an output of the reduction unit.

13. A method for manufacturing hot rolled steel sheets comprising the steps of:

passing molten steel through a continuous caster having a [mold after having been poured into a ladle and a tundish to manufacture a slab;

cutting the slab to predetermined lengths using a] first cutter to form a plurality of cut slabs;

heating the cut slabs to a first predetermined temperature [of a first rolling] in a first heating furnace;

width rolling the cut slabs by using a width roller;

descaling the cut slabs heated in the first heating furnace;

rolling the slabs in a reduction unit to a predetermined thickness to form a plurality of flat bars;

heating the flat bars to a second predetermined temperate [of a second rolling] in a second heating furnace;

coiling the flat bars by a coiling station while the flat bars are maintained in a heated state;

uncoiling [a] the plurality of flat bars by uncoilers; and

rolling the flat bars to a predetermined thickness in a finishing mill, in a reversible manner, while a rear end of a [bar steel] flat bar undergoing rolling is joined to a front end of another [bar steel] flat bar waiting to be rolled such that the [bar steels] flat bars can be continuously rolled; and

cutting the flat bars to a predetermined length by a third cutter.

18. The method of claim [16] 13 wherein the slabs being rolled in the reduction unit are maintained to a temperature between 800 and 1000° C at an output of the reduction unit. --